SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes identification of electrical materials, equipment, and installations.

1.2 REFERENCE STANDARDS

Applicable only to the extent specified.

A. American National Standards Institute (ANSI)

1. A 13.1 Scheme for the Identification of Piping Systems
2. C2 National Electrical Safety Code

B. Federal Aviation Administration (FAA)

1. C-1217f Electrical Work, interior

C. National Fire Protection Association (NFPA)

1. 70 National Electrical Code (NEC)

1.3 SUBMITTALS

A. Components and installation shall comply with NFPA 70.

B. Comply with requirements of ANSI standard A13.1, with regard to type and size of lettering for conduit and cable labels.

C. Samples for each color, lettering style, and other graphic representation required for tubing, tags, labels, markers, and other identification materials; samples of labels and signs.

D. Shop drawings showing installation method for each type of identification device.

1.4 QUALITY ASSURANCE

A. Components and installation shall comply with NFPA 70.

B. Comply with the requirements of ANSI A13.1 with regard to type and size of lettering for conduit and cable labels.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate installing electrical identification after completion of finishing where identification is applied to field-finished surfaces.

B. Coordinate installing electrical identifying devices and markings prior to installing acoustical ceilings and similar finishes that conceal such items.

PART 2 - PRODUCTS

2.1 CONDUIT AND CABLE LABELS

A. Materials procured and installed in this Section shall be in accordance with FAA C-1217f. Identification and nameplates shall be in accordance with FAA C-1217f, paragraphs 4.16 and 4.16.1.

B. Manufacturer's Standard Products: Where more than one type is listed for a specified application. Selection is Installer's option. Provide single type is for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.

C. Conform to ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each conduit or cable size.

1. Color: Black legend on orange field.
2. Legend: Indicates voltage and service.

D. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl. Legend over-laminated with clear, weather- and chemical-resistant coating.

E. Heat Shrink Tubing: Preprinted, embossed, permatized, 20 year life. Size to suit conductors; lettering shall be legible after heat shrinking.

F. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic bands sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

G. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch wide.

H. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with pre-printed numbers and letters.

I. Plasticized Card-stock Tags: Vinyl cloth with pre-printed legends. Orange background, except as otherwise indicated, with eyelet for fasteners.

J. Brass Tags: Metal tags with stamped legend, punched for fasteners. Dimensions: 2 inches by 2 inches by 0.05 inch.

2.2 ENGRAVED NAMEPLATES AND SIGNS

A. Manufacturer's Standard Products: Where more than one type is listed for a specified application. Selection is Installer's option. Provide single type for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.

B. Engraving Stock: Melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 sq. in., 1/8 inch thick for larger sizes.

1. Engraved Legend: White letters on black field.
2. Punched for mechanical fasteners.

C. Interior Warning and Caution Signs: Pre-printed aluminum, baked enamel finish with 1/4 inch grommets in corners for mounting.

1. Color, size and legend: appropriate to the application.
2. Punched for fasteners.

D. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties with the following features:

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb. minimum.
3. Temperature Range: Minus 40 to 185 deg F.
4. Color: As indicated where used for color coding.

B. Paint: alkyd-urethane enamel over primer as recommended by enamel manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install identification devices according to manufacturer's written instructions.

B. Install labels where indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

C. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations used in the Contract Documents or required by codes and standards. Use consistent designations throughout the Project.

D. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.

E. Self-Adhesive Identification Products: Clean surfaces of dust, loose material, and oily films before applying.

F. Install painted identification as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.
2. Prime Surfaces: For galvanized metal, use single-component, acrylic vehicle coating formulated for galvanized surfaces. For concrete masonry units, use heavy-duty, acrylic-resin block filler. For concrete surfaces, use clear, alkali-resistant, alkyd binder-type sealer.
3. Apply one intermediate and one finish coat of silicone alkyd enamel.
4. Apply primer and finish materials according to manufacturer's instructions.

G. Identify Conduits with Color Banding: Band exposed and accessible conduits of the systems listed below for identification.

1. Bands: Pretensioned, snap-around, colored plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of 2-color markings in contact, side by side.
2. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25 feet in congested areas.
3. Colors: As follows:

a) Fire-Alarm System: Red.
b) Fire-Suppression Supervisory and Control System: Red and yellow.
c) Security System: Blue and yellow.
d) Mechanical and Electrical Supervisory System: Green and blue.
e) Telecommunications System: Purple and White.

H. Install Circuit Identification Labels on Boxes: Label externally as follows:

1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
2. Concealed Boxes: Plasticized card-stock tags.
3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.

I. Color-Code Conductors: The following field-applied color-coding methods may be used in lieu of factory-coded wire listed in Section 16120 "Wires and Cables" for sizes larger than No. 4

AWG. Contractor shall demonstrate non-availability of factory colored wire before using this application

1. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last 2 turns of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Adjust tape bands to avoid obscuring cable identification markings.

    a. Where conductors are color coded by this method, they shall be color coded in accessible conduits, panelboards, outlets, and switches, as well as at all terminations. Conductors in accessible conduits shall be color coded so that by removing or opening any cover, the coding will be visible.
    b. Phase, ground, and neutral conductors shall be color coded in accordance with Section 16120, "Wires and Cables."

2. Green insulated conductors shall not be re-identified for purposes other than grounding.

3. White or neutral grey conductors shall not be re-identified for purposes other than grounded neutrals.

J. Apply identification to conductors as follows:

1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.

2. Power and Lighting Circuits at Enclosure and at terminations: Identify each conductor with panel designation, circuit number, voltage, and phase.

K. Apply warning, caution, and instruction signs and stencils as follows:

1. Install warning, caution, and instruction signs where indicated or required to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved, plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation.

2. Emergency-Operating Signs: Install engraved laminate signs with white legend on red background with minimum 3/8-inch-high lettering for emergency instructions on power transfer, and other emergency operations.

L. Install identification as follows:

1. Apply equipment identification labels of engraved plastic laminate on each major unit of equipment, including central or master unit of each system. Provide equipment, required under Division 16, as follows: with nameplate indicating equipment name, system voltage(s) and phase. Except as otherwise indicated, provide a single line of text with 1/2-

inch-high lettering on 1-1/2-inch-high label; where 2 lines of text are required, use 2-inch-high label. Apply labels for each unit of the following categories of equipment:

a) Electrical cabinets, and enclosures.

2. Label conduit at each end and at pull boxes with characters a minimum 1/4 inch high.

3. Apply designation labels of engraved plastic laminate for disconnect switches, breakers, push buttons, pilot lights, and similar items for power distribution and control components above, except panelboards and alarm/signal components where labeling is specified elsewhere. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

*****END OF SECTION 16195*****